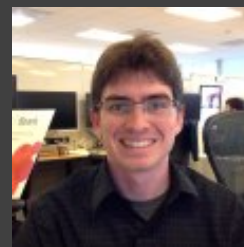




# JUPYTERLAB EXTENSIONS



## Mentors



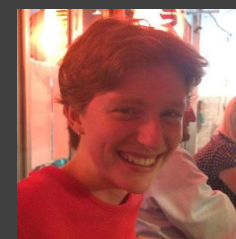
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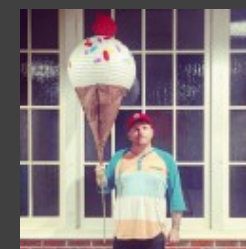
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## What is JupyterLab

What are JupyterLab Extensions

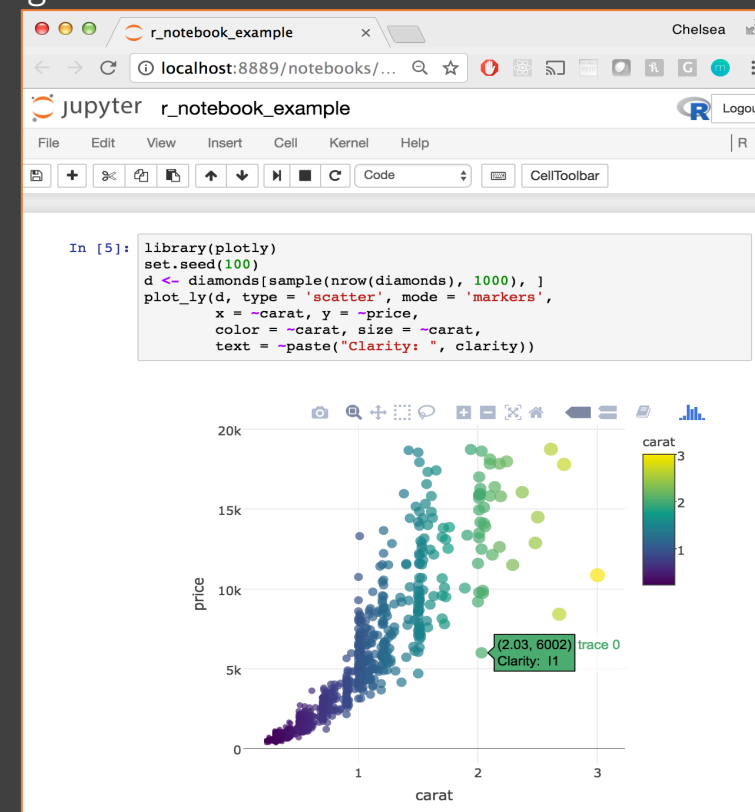
Why use JupyterLab Extensions

Installing Extensions

Creating an Extension

# What is JupyterLab?

- Started from classic Jupyter Notebook, a web-based interface that can execute code, edit in-place, contain text, images, etc.
- Notebooks presents a document-like view rendered by modern browsers
- Kernels interpret/execute cell contents with support for over 50 programming languages
- Classic Notebook:



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# What is JupyterLab?

- JupyterLab is the next generation UI for Project Jupyter
- It provides a modular and extensible architecture
- It will eventually replace the classic Jupyter Notebook UI
- JupyterLab:

The screenshot displays the JupyterLab user interface. On the left is the 'File Explorer' sidebar showing a file tree with folders like 'Untitled Folder' and files like 'ml-linearreg.ipynb'. The main area is a 'Tabbed Workspaces' environment. The top tab is 'Terminal 1' showing a shell prompt. The second tab is 'sample.md' containing markdown text. The third tab is 'ml-linearreg.ipynb', which is active and split into two panes. The top pane shows code for a linear regression model. The bottom pane displays a scatter plot titled 'Predicted Profit vs. Population Size' with blue dots for 'Training Data' and a red line for 'Prediction'. Below the plot is a text block explaining the results of the gradient descent function. The bottom status bar shows 'Python 3 | Idle' and 'Mode: Command'.

File Explorer

Console/Terminal

Tabbed Workspaces

Split screen

# What is JupyterLab?

- On [JupyterLab Org Github](https://github.com/jupyterlab) :

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A screenshot of the JupyterLab GitHub repository page. The page shows the repository 'jupyterlab' with a description 'JupyterLab computational environment.' and statistics: 9.7k stars and 1.6k forks. It also lists other pinned repositories: 'jupyter-renderers', 'lumino', 'team-compass', 'extension-cookiecutter-ts', and 'extension-examples'. Annotations with arrows point to the 'jupyterlab' repository and the 'jupyter-renderers' repository, with labels 'JupyterLab and core extensions' and 'JupyterLab extension repos' respectively. The 'jupyterlab' repository is highlighted with an orange border. The 'extension-examples' repository is also highlighted with an orange border. The 'debugger' repository is visible at the bottom left, and the 'Top languages' section is at the bottom right.

**JupyterLab**  
JupyterLab: The Next Generation UI for Project Jupyter  
https://jupyter.org project.jupyter@gmail.com

Repositories 43 Packages People 72 Projects

**Pinned repositories**

- jupyterlab**  
JupyterLab computational environment.  
JavaScript ★ 9.7k 🍴 1.6k
- jupyter-renderers**  
Renderers and renderer extensions for JupyterLab  
Jupyter Notebook ★ 347 🍴 51
- lumino**  
Lumino is a library for building interactive web applications  
TypeScript ★ 101 🍴 26
- team-compass**  
A repository for team interaction, syncing, and handling meeting notes across the JupyterLab ecosystem.  
★ 15 🍴 5
- extension-cookiecutter-ts**  
A cookiecutter recipe for JupyterLab extensions in TypeScript  
Python ★ 67 🍴 27
- extension-examples**  
JupyterLab Extensions by Examples  
TypeScript ★ 60 🍴 13

Find a repository... Type: All Language: All

**debugger**  
A visual debugger for Jupyter notebooks, consoles, and source files  
TypeScript BSD-3-Clause 🍴 18 ★ 240 ⓘ 44 (1 issue needs help) 🍴 4  
Updated 22 minutes ago

**Top languages**

- TypeScript Python
- Jupyter Notebook JavaScript
- CSS

# What is JupyterLab?

- On [JupyterLab Github](#) :

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Backend code:

- Handlers
- Commands
- Debug
- Extension setup
- etc

Core extensions:

- Application
- Utils
- Code editor
- Notebook
- etc

A screenshot of the JupyterLab GitHub repository page. The page shows the repository name 'jupyterlab / jupyterlab' with statistics: 16.8k used by, 338 watches, 9.7k unstars, and 1.6k forks. It also shows 1,335 issues, 68 pull requests, 2 projects, 0 wiki pages, 0 security advisories, and 0 insights. The repository description is 'JupyterLab computational environment.' with a link to the documentation. Below this, there are statistics: 18,671 commits, 22 branches, 0 packages, 10,532 releases, and 293 contributors. A table of recent commits is visible, with columns for commit message and time ago. The 'packages' directory is highlighted in the file list, and an arrow points from the 'Core extensions' box to it.

Commit Message	Time Ago
Fix string quoting	23 days ago
increase timeout for binder launch	2 months ago
Apply it to...	10 days ago
...	6 months ago
...	6 days ago
...	6 days ago
...	10 days ago
...	2 years ago
...	6 days ago
...	6 days ago
Add a Docker file for a clean release environment	8 months ago
Lint files	10 days ago

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# What are JupyterLab Extensions

JupyterLab is designed to be extendable

Extensions enable users and developers to:

- Create new editors and output visualization
- Add buttons and menu items to existing functionality
- Provide APIs for other extensions to use

JupyterLab itself is just a collection of core extensions

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# Why use JupyterLab Extensions

The core extensions are intentionally limited in scope

Every user needs slightly different tools for their own work

By installing extensions specific to their scenario they can create a customized environment tailored to their work



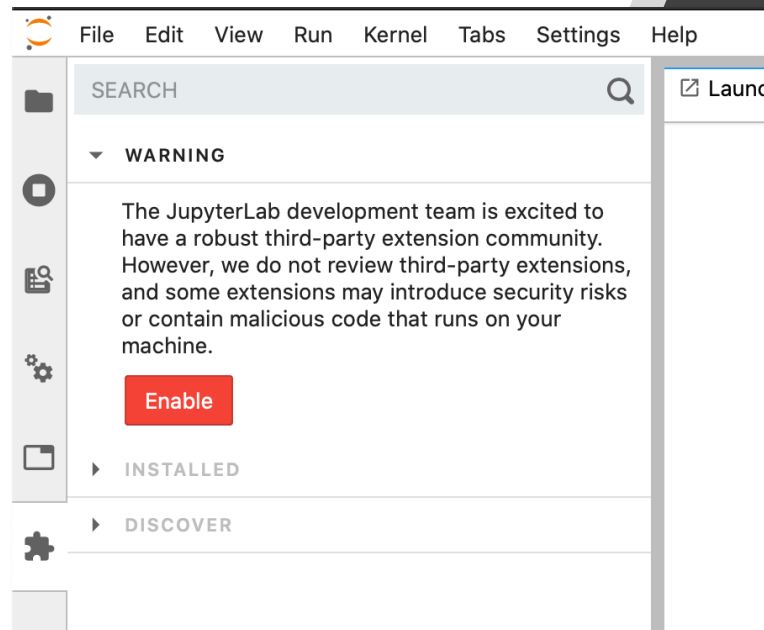
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# Installing Extensions

1. Start JupyterLab

```
$ jupyter lab
```

2. To install an extension via the UI open the Extension Manager tab in the side bar

- The UI is still experimental and will show a warning prior to enablement

3. Once enabled it will list currently installed extensions in the Installed section and extensions available to install in the Discover tab.

- You can search both sections using the search bar
- The Discover tab displays packages published on npm with the keyword 'jupyterlab-extension'



What is JupyterLab

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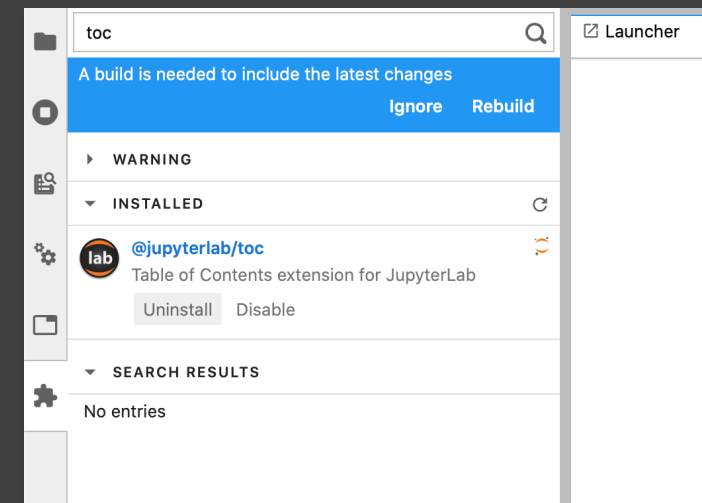
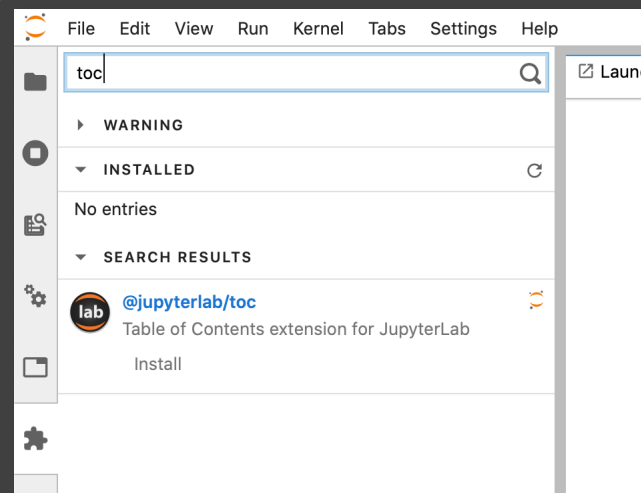
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# Installing Extensions

4. In the search bar, search for "toc" and click Install
5. After installing it will prompt you to rebuild jupyterlab



What is JupyterLab

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Why use JupyterLab Extensions

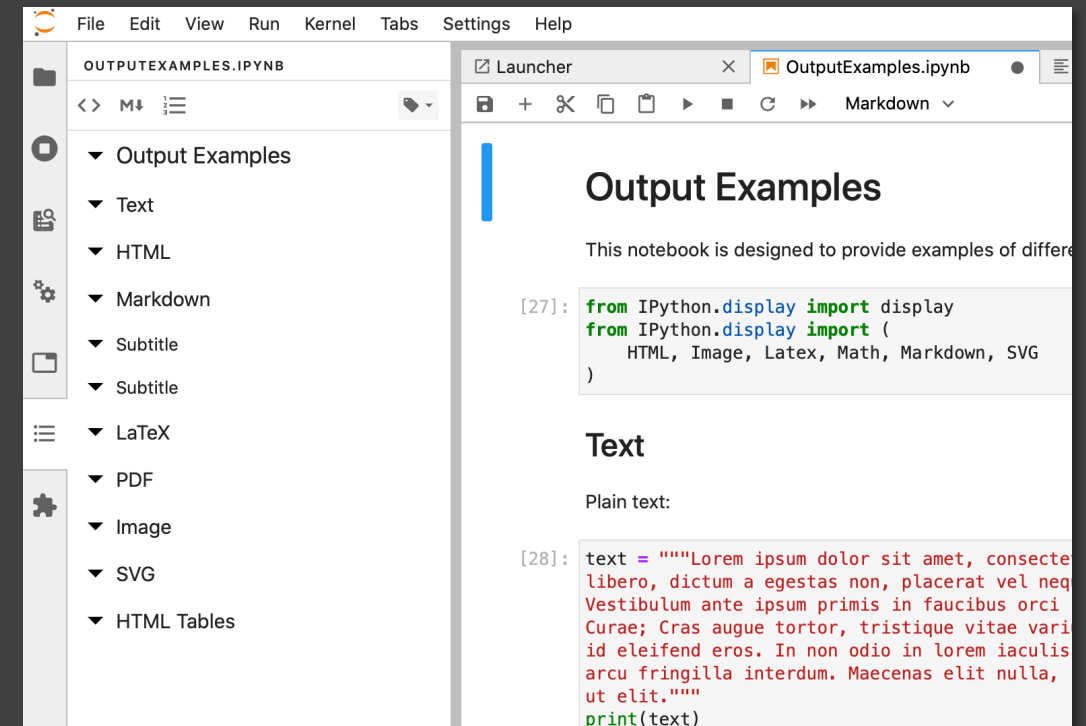
**Installing Extensions**

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# Installing Extensions

6. Once it finishes installing it will prompt you to refresh
7. After refreshing you will see the new TOC tab in your sidebar, try opening the TOC tab while a notebook, markdown, or python file is open





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## Installing Extensions

8. Some extensions can't be installed via the UI. Try searching for and installing "git". It will display a message telling you that the extension requires requires a corresponding server extension.

9. For server extensions we need to install via the CLI

1. Go back to your terminal and (double) ctrl-C lab

2. Then install the git extension:

```
$ pip install jupyterlab-git
```

```
$ jupyter lab build
```

3. This will install both the lab extension and the server extension. Once it's finished start JupyterLab again:

```
$ jupyter lab
```

### Definitions:

labextension – front end extensions; can be installed and built via UI without restarting JupyterLab

serverextension – back end extensions; must be installed via CLI and require restarting JupyterLab

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# Creating an Extension

1. Creating a new extension using the cookie-cutter

```
$ pip install cookiecutter
```

```
$ cookiecutter  
https://github.com/jupyterlab/extension-  
cookiecutter-ts
```

2. Customizing your extension (following the guide on the next slide)
3. Installing your extension (following the generated README)
4. Running JupyterLab with your extension

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# Creating an Extension

A few quick steps to an example custom extension

- Add these dependencies to package.json

```
"@jupyterlab/apputils": "^2.0.0",  
"@jupyterlab/docregistry": "^2.0.0",  
"@jupyterlab/notebook": "^2.0.0",  
"@lumino/disposable": "^1.3.5"
```

- Copy button.ts in examples to src and import it in index.ts

```
import {ButtonExtension} from "../button";
```

- Add this code to the activate function in index.ts

```
let buttonExtension = new ButtonExtension();  
app.docRegistry.addWidgetExtension('Notebook',  
buttonExtension);
```

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## Useful Links

JupyterLab Docs: <https://jupyterlab.readthedocs.io/>

Extension cookie-cutter: <https://github.com/jupyterlab/extension-cookiecutter-ts>

GitHub Topics filter for finding extensions:  
<https://github.com/topics/jupyterlab-extension>